

Understanding Nexus Between EPA's

ACE 111(d) Proposed Rule for

Electric Utilities

&

OOOOa Proposed Rule for gas transmission

Presentation to U. S. EPA ACE 111(d) Team and Oil & Gas Team for NSPS and OOOOa related issues for power sector

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Experience

13 years in electric sector;

7 years oil/gas sector (including 15 months in pipelines);

11 years in manufacturing advocacy;

Private consulting to power sector, steel related manufacturing & oil/gas;

NERC committee on Single Point of Disruption Study (SPOD) on gas storage and electric utilities (2017);

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

Gas transmission infrastructure for electric utilities paper (2017)

<https://theresapughconsulting.com/wp-content/uploads/2017/01/gaspaper-jan-2017.pdf>

Member of UARG and lead on gas infrastructure-related issues for UARG 2010-2014;

Consulting to LNG for domestic nat gas storage; and

Designed and wrote part of 2010's APPA study-still relevant (detailed analysis done by

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Author

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Do you have a bigger photo

Served on NERC 2017-2018 Nat Gas Infrastructure Study on Bulk Electric for Reliability

Study identifies 24 areas of country where there could be local but severe disruptions due to lack of adequacy of gas infrastructure for power sector

NERC makes recommendations for Dual Fuel option (and EPA to allow for permitting #2 fuel oil during ozone season) during gas force majeure or voltage drop as one method to minimize problems

NERC recommends other gas and power sector to undertake for reliability

NERC recommends other industry standards including cyber

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

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Why ACE and OOOOa/NSPS for Existing Pipelines & Compressor Stations Must Accommodate One Another

Unlike coal-fired power plants that typically hold 29 days to four months of coal on the site, gas plants will nominate daily for that day's natural gas use;

Gas-fired power plants >50 mw cannot "line pack" gas for storage;

Gas-fired plants will cycle or ramp more with intermittent renewables so the gas transmission infrastructure matters more than with coal fired plants; and

PHMSA, state agencies and EPA have regulatory requirements for repairs on compressor stations, pipelines & gas storage.

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Take Away From This Briefing

Gas-fired electric utilities and gas infrastructure are more heavily connected than coal-fired power plants to their coal mines or railroads since natural gas cannot be stored;

EPA needs to understand the connection between these two industries when regulating NSPS 111 (b) (d) for power and OOOOa for "existing sources";

ACE 111(d): Remaining useful life of the plant may be affected by slow permitting approval process for natural gas infrastructure (compressor stations & pipelines) and should be accommodated when states and EPA consider WHICH energy efficiency measures are feasible;

0000a: Proposed leak repair timing changes to annual is excellent improvement for majority of compressor stations and pipelines across country;

0000a: Pipelines or compressor stations serving only one power plant should conduct semi-annual methane leak and repairs but coordinated timing for repairs to not cause problems for power sector during shoulder season with 1 week's notice to RTO, planning authority or power customer. If re routing portable gas storage or secondary CS/pipes are added-the leak monitoring frequency moves to less frequent.

0000a: Where compressor stations and pipelines are sole source for gas transmission for power plants, they should have to keep sufficient quantity of variety of types of CS valve replacement parts on site for timely repair response;

ACE 111(d): EPA and states should be encouraged to allow for dual fuel Title V permitting when voltage support is low or when there are non-storm emergencies and quick need to rely upon biomass, oil, or other fuels to be burned at power plant. #2 fuel oil should be allowed during ozone season when there is a force majeure on gas pipeline or gas storage system; and

Upstream low gas/oil production wells should not have to conduct methane leak monitoring/leak repairs under 0000a or future NSPS if they meet IRS classification of low-production wells. These producers are most cash strapped and those shale gas formations have wide variation in actual predictable production in first 12-18 months.

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Predictions of Coal Plant Retirements

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Some types of events that might cause short-term & localized service disruptions from natural gas infrastructure blowdowns at compressor station if there is no pipeline re-routing available...

Blowdown events are due to need to vent the methane gas for safety reasons and usually cannot be scheduled in advance;

Not all new or existing gas pipelines have re-routing or duplicative delivery systems for power sector if a compressor station or gas storage location is under service repair for 0000a or PHMSA regulations;

Service interruptions at gas storage facilities are not common but are possible (ex. Aliso Canyon);

Firm contracts help avoid service interruptions but they do not prevent force majeure on gas storage or gas transmission system;

Methane leak repairs not scheduled at right time for power sector unless there is re-routing option using other pipelines or portable natural gas storage;

Compressor station blowdown (venting) of methane where no -rerouting is available or portable storage is available:

<https://www.youtube.com/watch?v=WtSH5V1YQvQ>

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Timing for Fugitive Compressor Stations/Pipeline Leaks Might Affect A Utility's Localized Reliability & Costs

Compressor stations located approximately every 80 miles;

Each compressor station has an average of 1,500 parts that can at some point leak;

Typical leak repairs require 1 day, week or 1 month;

Evacuate gas on up to 5 miles of pipeline in all directions of NEW compressor stations;

A few compressor station leaks require up to 1 year for replacing valves-but where are they??;

If a power plant is being served by compressor station or pipeline that is taken out of commission due to PHMSA or EPA regulations requiring repairs this could be a short term concern unless the pipeline has multiple routing (Similar to rail issues).

Some pipeline repairs following LDAR can reach into existing pipelines depending upon configuration

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NERC Gas Infrastructure Reliability Study

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NERC's Observation of Where Electric Reliability Can Be Affected by Compressor Stations & Pipeline Downtime

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NERC, Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System, Page 25

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

NERC Identifies Power Generators Served By ONE Trunk line (pipeline)

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NERC, Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System, Page 7

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

NERC's Nov. 2017 Map of 40 Electric Generation Clusters in 7 Regions With Local Reliability Concerns

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NERC, Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System, Page 17

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

NERC Identifies Current Power Flow Problem Locations

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NERC, Special Reliability Assessment: Potential Bulk Power System Impacts Due to Severe Disruptions on the Natural Gas System, Page 20

https://www.nerc.com/pa/RAPA/ra/Reliability%20Assessments%20DL/NERC_SPOD_11142017_Final.pdf

When Will Utilities Build More Natural Gas Plants?

Electric load growth is still flat in most regions & EIA predicts electric load to be flat for next 2 decades;

Push for Renewable Energy in >20 states with RPS standards;

Customer pressures for renewables; &

Demand Side Management often fills in any delta for small electric load loss with coal-fired or nuclear plants retiring.

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Natural Gas Infrastructure Readiness May Pose a Bottleneck In Early Transition Years in Some Locations- and May Affect Remaining Useful Life of Plant short term determinations

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300,000 MI OF EXISTING PIPELINES WITH MOST NEW PIPELINES SERVING UPSTREAM OIL/GAS--
NOT YET ADEQUATE TO SERVE NEW NGCCs

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Delays in Pipeline Permitting and Financing

Delays in natural gas pipeline approvals influenced by a number of factors including Section 404 CWA petitions; slow down at FERC; more state regulatory agency permit hearings. Some financing slowdowns affected by market pressures to invest in oil versus gas pipelines as oil prices rise.

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Natural Gas Storage "Deserts" Need Infrastructure for Gas Generation Switch

Pipelines cannot always be line packed adequately for larger power plants;

Gas moves 25-40 miles per HOUR- some plants 6-9 hours from storage;

Many states have geology unsuitable for gas storage;

Dec. 2016 DOE Report (Moniz) suggested storage facilities were old and need updates- power sector to plan for "dual fuel" (oil);

Unrealistic expectation that oil units can be run as "dual fuel" during April-Sept in ozone nonattainment areas; some fuel handling units aren't up to date; SPCC spill regs may not current for oil handling (manmade berms etc.); limits on sequential running time of oil units (ex. <10%)

Solid blue states indicate states where underground GAS storage is not possible due to geology- places more stress on pipelines for delivery

Source: Aspen Environmental

Dual Fuel Sounds Like a Silver Bullet for Power Sector But...

Dual fuel (oil) limited by Clean Air Act permits typically to <10% of total year;

Dual fuel (oil) not allowed during summer ozone season during summer peak electric use;

Few dual fuel across country have the obligations that New England generators have under state law;

Some Title V permits only allow dual fuel (oil) when Governor or FEMA issues emergency orders (flooding, tornado, hurricane, ice storms) and these conditions are not realistic for gas infrastructure force majeure events;

Some "dual fuel" units were permitted thirty years ago but not maintained or sized for sufficient for oil or meet SPCC (RCRA) tank integrity;

EPA should allow CAA Title V permits or variances for compensation during localized natural gas infrastructure reliability/voltage support problems;

Dual fuel should allow biomass as 111(d) compliance option and to minimize electric reliability problems; and

Permitting of non-export LNG for gas storage in states where no geology is suitable for underground gas storage.

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Recommendations for 0000a Proposed Rule for Electric Generation

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Recommendations for 0000a on Midstream Compressor Stations & Pipelines

Annual methane leak detection and repair on new compressor stations/pipelines if a power plant customer is served by a pipeline/compressor station with re-routing or methane storage capability (based upon peak hour usage) within 30 miles to maintain service to power sector;

If power plant is not served by pipeline/compressor station with re-routing or on site gas storage and repair capability within one day then EPA should require semi-annual leak detection on that pipeline or compressor station;

All leak repair requirements at EPA & PHMSA should take into account whether power plants, hospitals or data centers are served only by one gas facilities and repairs undertaken within days if no redundancy in pipelines or compressor stations and ability to meet maximum peak hour capacity;

Other gas pipelines with re-routing redundancies should be given 90 days to complete repairs unless during winter or summer peak use (and provided another 2 months during winter/summer) in lower 48 states;

Where no redundancies in pipeline or gas storage (beyond line packing) and where compressor stations/pipelines serving power sector, advance notice of repair not less than 1 week AHEAD notice to planning authority, RTO & NGCC power plants of anticipated methane leak repair;

Pipeline compressor station valve replacement inventory should be maintained on site for compressor stations if serving power sector, hospitals, data centers, police, fire, EMT, or city gates for LDCs.

Compressor stations serving power stations, data centers & hospitals should have option of gas instead of electric for reliability purposes (or both). (Anticipating this in ozone/PM regulations)

EPA should look for data on high ramping related vibration impacts on compressor stations serving power plants with >15% intermittent renewable generation. May need to be addressed for existing NSPS for methane on pipelines.

Alaska: Alaska compressor stations and pipelines need longer times for leak monitoring, use of alternative detection technologies, and yet also require those stations to maintain valve replacement and other parts for corrosion repairs. Alaska transports parts by airplane /barges except for rare areas served by rail. Pipelines and compressor stations need maximum anticipation of valve replacement and weather conditions. Repair equipment/parts need to be on site.

Upstream: Treat low-production wells differently with longer time to allow producers time to invest. Investment decisions can vary over first 18-24 month period based upon price of commodity and decline rate. Decline rates don't always show up on day one. Use IRS classification for "low production"- don't create new definitions under 0000a.

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Misc: Recommendation for Upstream Low-Production Wells in 0000a Rule

EPA asked for comments on low production for to methane leak detection and repair (reporting) costs.

What do soda bottles and shale gas have in common?

Think of judging the volume of liquid in soda bottle once a soda bottle is shaken- volume of soda appears to be far greater than liquid actually inside when first opened due to pressure. Similar to guessing decline rates in shale gas production in first few weeks.

Low production wells: Defer to upstream industry experts but can observe that many new shale formations have producers that need 12-18 months to review production reports and watch for decline rate & current nat gas prices before those wells are known to be economical enough to invest in transmission. Recommend that EPA give low-production wells up to 18 months to determine whether they will actually produce from those wells before requiring methane leak/repair and reporting obligations.

Many larger production companies voluntarily undertaking methane recovery technologies where this allows them to recover natural gas product.

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